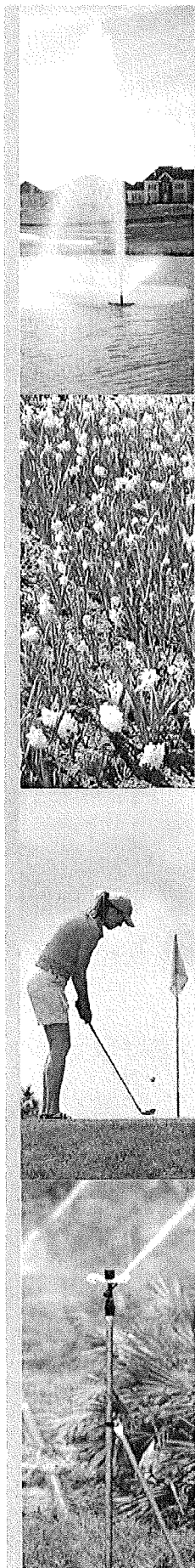


# Fairfax County *Wastewater Management*

## Reclaimed Water Management Plan

June 2010

**CDM**



# Fairfax County Reclaimed Water Management Plan

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Appendix C	Reuse Service Agreement Template
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Appendix E	Best Management Practices for Irrigation with Reclaimed Water
Appendix F	Bulk Irrigation Site Plans

# Section 1

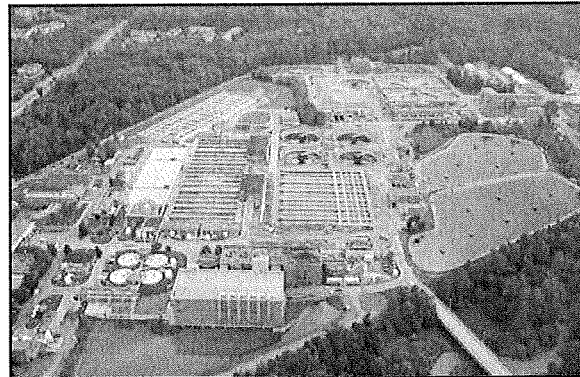
## Introduction

### 1.1 Background

Fairfax County is seeking to develop a Water Reuse Program for distribution of the Noman M. Cole, Jr., Pollution Control Plant (NMCPCP or the Plant) treated effluent to potential users in certain areas of the southern portion of the County.

Fairfax County is located within the Potomac watershed of the Chesapeake Bay (Bay) and is faced, as are other local jurisdictions, with a nutrient load limit on surface water discharges. Ever-tightening nitrogen and phosphorus loads to the Bay and special Water Quality limits established by the Commonwealth of Virginia (State) require Fairfax County to upgrade NMCPCP for Enhanced Nutrient Removal (ENR) and alternate methods for nutrient reduction. The NMCPCP is currently being upgraded to meet the nutrient requirements set forth by the Chesapeake Bay Regulations. Reuse is one of the alternate methods Fairfax County is using to reduce nutrient discharges and meet their water supply needs.

The Plant is currently permitted at 67 million gallons per day (mgd) annual average daily flow (AADF) and discharges its effluent via an outfall to Pohick Creek, a tributary to the Potomac River. The Biological Nutrient Removal (BNR) treatment and Advanced Wastewater Treatment (AWT) processes at NMCPCP produce an extremely high quality effluent, and it has the potential to serve as a source of additional usable water for industrial and commercial non-potable applications within Fairfax County. The Plant is a participant in the Virginia Environmental Exchange program at the Exemplary Environmental Enterprise (E3) level.



*Noman M. Cole, Jr., Pollution Control Plant*

### 1.2 Purpose

The Virginia Water Reclamation and Reuse Regulation (Code 9VAC25-740), effective October 1, 2008, states that a Reclaimed Water Management (RWM) Plan is required for a reclamation system that provides reclaimed water directly to an end user(s). This RWM Plan is being prepared in support of VPDES Permit No. VA0025364, issued by the Virginia Department of Environmental Quality on April, 2008 for the NMCPCP.

The requirements set forth by the State for a RWM Plan, as described in the Virginia Water Reclamation and Reuse Regulation include the following:

1. A description and map of the reclaimed water service area;
2. A current inventory of impoundments, ponds or tanks that are used for system storage of reclaimed water;
3. A water balance model;
4. An example of service agreements or contracts to be established by the applicant or permittee with end users;
5. A description of a program to monitor end users;
6. An education and notification program;
7. A cross connection and backflow prevention program; and
8. A description of how the quality of reclaimed water in the reclaimed water distribution system shall be maintained to meet the standards for the intended reuse or reuses of the reclaimed water.

In accordance with the above permit requirements, this RWM Plan for the NMCPCP outlines Fairfax County's planned reclaimed water system including production, storage, and distribution of high quality reclaimed water for non-potable use. The future system will provide reclaimed water for industrial and commercial facilities within Fairfax County.

## 1.3 Report Outline

The content of this report is divided into four sections and appendices as described below:

- Section 1: Introduction
- Section 2: Reclaimed Water System – Discusses the proposed reclaimed water system including the water balance model, potential reclaimed water customers, supplies, and demands.
- Section 3: Regulatory Considerations – Describes the reclaimed water treatment level requirements and monitoring requirements for bacteria, pH, turbidity, BOD<sub>5</sub> and TSS.
- Section 4: Implementation Strategy – Summarizes programs necessary to implement the reclaimed water system including public education program, cross connection program, back flow prevention program, service agreements, and customer contracts.

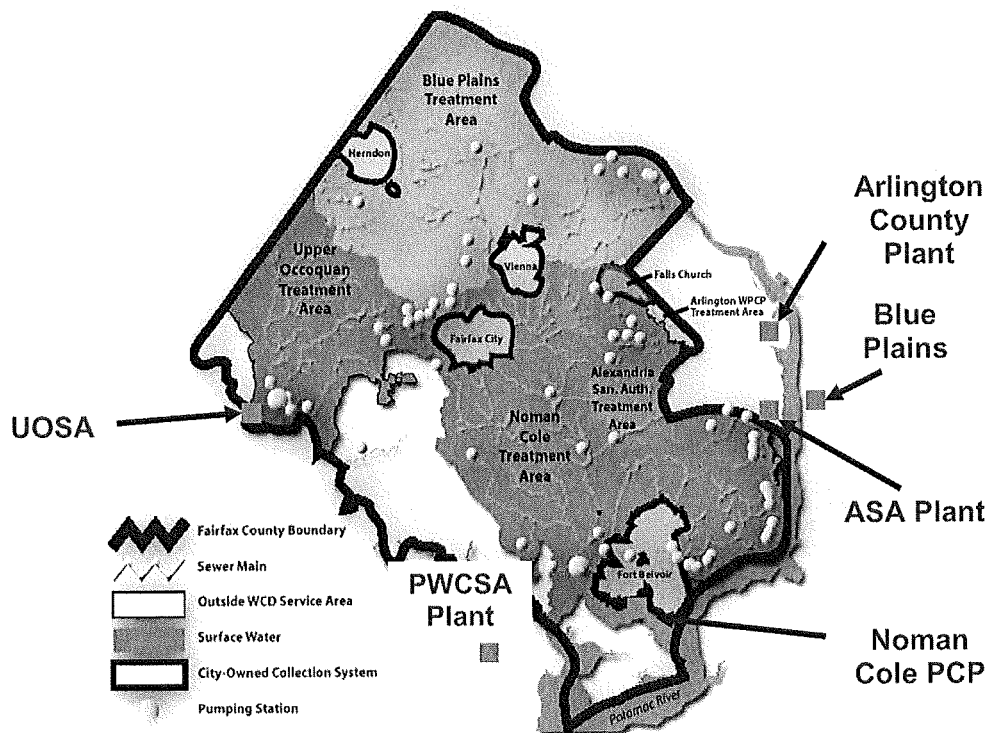
- Appendices – Documents required by the VA Reuse Regulations to meet the requirements.

## Section 2

# Reclaimed Water System

### 2.1 Reclaimed Water Source

Fairfax County serves 340,000 residents and business with sanitary sewer service within Fairfax County, Virginia. The total system can collect and treat 161 mgd of wastewater and covers an area of nearly 234 square miles. Fairfax County currently provides wastewater service through nearly 3,300 miles of sewer and 62 pump stations located throughout Fairfax County. The County currently operates one wastewater treatment plant and through inter-jurisdictional agreements, the County sends portions of their flow to six other treatment plants. Figure 2-1 shows the Fairfax County wastewater service area and the approximate location of the NMCPCP (the Plant).



**Figure 2-1**  
**Fairfax County Wastewater Service Areas**

The Plant has a design capacity of 67 mgd and is currently a BNR wastewater treatment facility consisting of preliminary treatment (mechanical screening), primary sedimentation, secondary treatment (biological nutrient removal, polymer addition, followed by secondary sedimentation), and advanced wastewater treatment (chemical addition/sedimentation followed by filtration). Disinfection is achieved using sodium hypochlorite, and the effluent is dechlorinated with sodium bisulfite prior to

discharge. A simplified process flow diagram is displayed in Figure 2-2. The average daily effluent flows (ADF) and average non-potable water (NPW) flow for NMCCPCP are displayed in Table 2-1 and Figure 2-3. NPW is chlorinated, treated effluent used on-site for non-potable purposes. NPW is distributed on-site by the Advanced Plant Water (APW) pump station.

## Wastewater Treatment Process

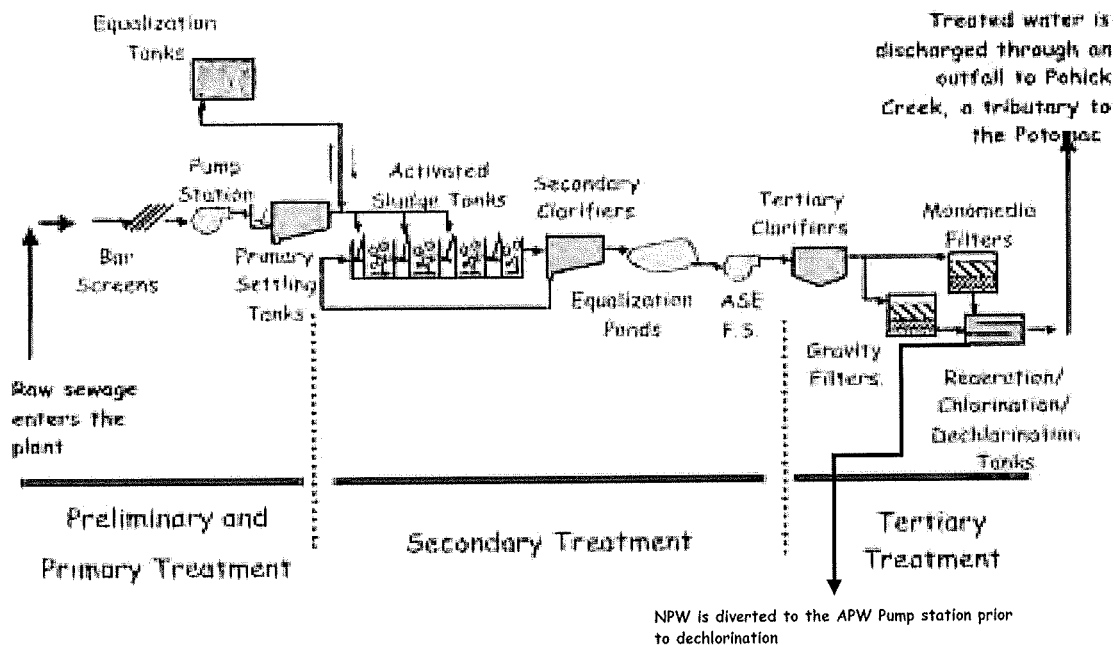


Figure 2-2  
NMCCPCP Process Flow Diagram

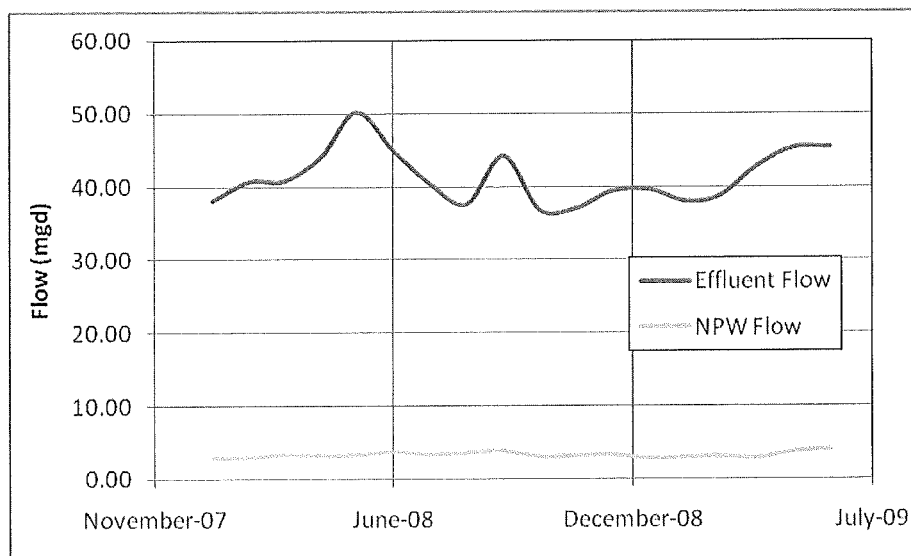
The NMCCPCP is currently permitted to discharge high quality effluent via an outfall to Pohick Creek, a Class III tributary to the Potomac River. Per Virginia Code 9VAC25-220-120, the designated uses for Class III surface water include, but are not limited to, "recreation, navigation, and cultural and aesthetic values." Current plans include utilizing this high quality effluent as a source for a reuse water system within the Fairfax County service area, as further described in Section 2.3.

Implementing a reuse program at the NMCCPCP will provide benefits to Fairfax County including an offset of current potable water use, postponement of wastewater treatment capital expenditures, and possible nutrient exchange options. Fairfax



**Table 2-1**  
**NMCPCP Effluent and NPW Flow Summary (mgd)**

	Plant Flow mgd	NPW Flow mgd
January-08	38.05	2.84
February-08	40.70	2.89
March-08	40.76	3.27
April-08	43.96	3.13
May-08	50.20	3.25
June-08	44.92	3.69
July-08	40.42	3.30
August-08	37.53	3.56
September-08	44.21	3.77
October-08	36.79	2.99
November-08	36.97	3.10
December-08	39.33	3.26
January-09	39.57	2.72
February-09	37.91	2.89
March-09	38.71	3.02
April-09	42.77	2.80
May-09	45.26	3.67
June-09	45.39	4.07
<b>ADF</b>	<b>41.30</b>	<b>3.23</b>



**Figure 2-3**  
**NMCPCP Effluent and NPW Flow Summary (mgd)**

County has begun implementation of a reuse system and is planning for a new reclaimed water main and storage tank to support a reuse system in the NMCPCP service area.

### 2.1.1 Significant Industrial Users

Table 2-2 lists the significant industrial users that contribute wastewater to NMCPCP and identifies the SIC Code/Description and NAICS Code/Description.

**Table 2-2**  
**Significant Industrial Users**

<b>Significant Industrial User</b>	<b>SIC Code/Description</b>	<b>NAICS Code/Description</b>
<b>Alexandria Coatings, LLC</b> (Alexandria Metal Finishers, Inc.) 9418 Gunston Cove Road Pretreatment	<b>3471 Electroplating, Anodizing &amp; Painting</b>	<b>332813 Electroplating, Anodizing &amp; Painting</b>
<b>Covanta Fairfax, Inc.</b> 9898 Furnace Road No Pretreatment	<b>4953 Refuse Systems (Incineration)</b>	<b>562213 Solid Waste Combusters</b>
<b>Shenandoah's Pride Dairy</b> 5325 Port Royal Road Pretreatment	<b>2026 Fluid Milk 2024 Ice Cream</b>	<b>311514 Fluid Milk Manufacturer 31152 Ice Cream Manufacturer</b>
<b>Tek Am Corporation</b> 5424 Port Royal Road No Pretreatment	<b>3479 Coating Engraving 3599 Metal Furniture / Metal Shop</b>	<b>332812 Metal Coating 332710 Machine Shop</b>
<b>Krispy Kreme Doughnut Corp</b> 10400 Furnace Road Lorton, VA	<b>5461 Bakery Retail</b>	<b>445291 Bakery Retail</b>
<b>Ener Sol Technologies, Inc., 9406-B Gunston Cove Road, Lorton, Virginia 22079</b>	<b>3541 Machine Tools</b>	<b>333513 Machine Tools</b>

## 2.2 Reclaimed Water Usage

Per the Virginia Water Reclamation and Reuse Regulation (Code 9VAC25-740-90), there are six major reuse categories, which include:

- Urban (unrestricted access);
- Irrigation (Unrestricted access);
- Irrigation (Restricted access);
- Landscape impoundments;
- Construction; and
- Industrial.

Each reuse category is defined with one of two acceptable treatment levels with minimum standard requirements based on their potential for human contact. Level 1 requires secondary treatment with filtration and a higher level of disinfection and includes different types of urban unrestricted access uses including: landscape

irrigation in public access areas, non-residential toilet flushing, fire fighting, or protection and fire suppression in non-residential buildings, outdoor domestic or residential reuse, commercial car washes and air conditioning systems. In addition, irrigation of unrestricted access, specific industrial uses, and landscape impoundments with potential for public access must meet effluent requirements covered in Level 1 standards. Level 2 requires secondary treatment and standard disinfection and includes restricted access irrigation, construction, landscape impoundments with no potential for public access or contact, and some types of industrial uses.

The NMCPCP achieves Level 1 standard requirements for reclaimed water through its BNR and AWT practices. Therefore, due to its exceptionally high quality effluent, the Plant is capable of providing reclaimed water (up to its design capacity) for all six major categories according to the specific application and demand identified by each potential reuse customer.

## 2.3 Reclaimed Water Service Area

Figure 2-4 shows the Fairfax County's proposed reclaimed water service area. Figure 2-5 shows the reclaimed water service area along with potential reuse customers (identified as of September 2009).

### 2.3.1 Proposed Reclaimed Water Demands

Over the past several years, Fairfax County has examined the feasibility of using reclaimed water from NMCPCP. The project team worked with County planners to create a list of all potential reuse customers within three miles of NMCPCP. This list was reduced based on usage rates and future capacity estimates. Peaking factors were also applied to determine potential main segments/trunk lines and possible pumping and distribution needs. The feasibility reported provided the basis for the reuse water service area. Figure 2-5 and Table 2-3 identify potential reclaimed users within the Fairfax County service area. Table 2-3 shows the anchor and potential reuse customers, reuse category for each customer, estimated annual reuse volume, estimated peak flows, estimated average daily flow during low demand periods, and total flows for each reuse category and for the service area.

The following anchor reuse customers have been identified by the County:

- Covanta Energy/Resource Recovery Facility (E/RRF), operated by COVANTA FAIRFAX, INC.
- Laurel Hill Golf Course and the Lower Potomac Park, owned and operated by the Fairfax County Park Authority, an independent Authority (owner/operator).

The area between the NMCPCP and the Covanta E/RRF plant and surrounding area constitutes the proposed reuse water service area. As shown on Figure 2-5, several

other potential customers have been identified, including Fort Belvoir, South County Secondary School, Cardinal Concrete Co., and Newington Concrete Corp.

At the time of the submittal of this RWM plan, Fairfax County was moving forward with discussions to provide reclaimed water to the Covanta E/RRF. The Covanta E/RRF is projected to use an average of 1,460 gpm (2.1 mgd) of reclaimed water for cooling towers.

By regulation, the use of reclaimed water for irrigation must be supplemental and is defined as "irrigation, which in combination with rainfall, meets but does not exceed the water necessary to maximize production or optimize growth of the irrigated vegetation" to which it is applied. To determine the supplemental irrigation rate, a number of calculation equations are available that account for evapotranspiration, vegetation growing periods, average precipitation, and other data. The Penman method of estimating will be used for the NMCPCP reuse program. This method includes the following equation:

$$Ir = ((ET_p * Kc) - r_e), \text{ where,}$$

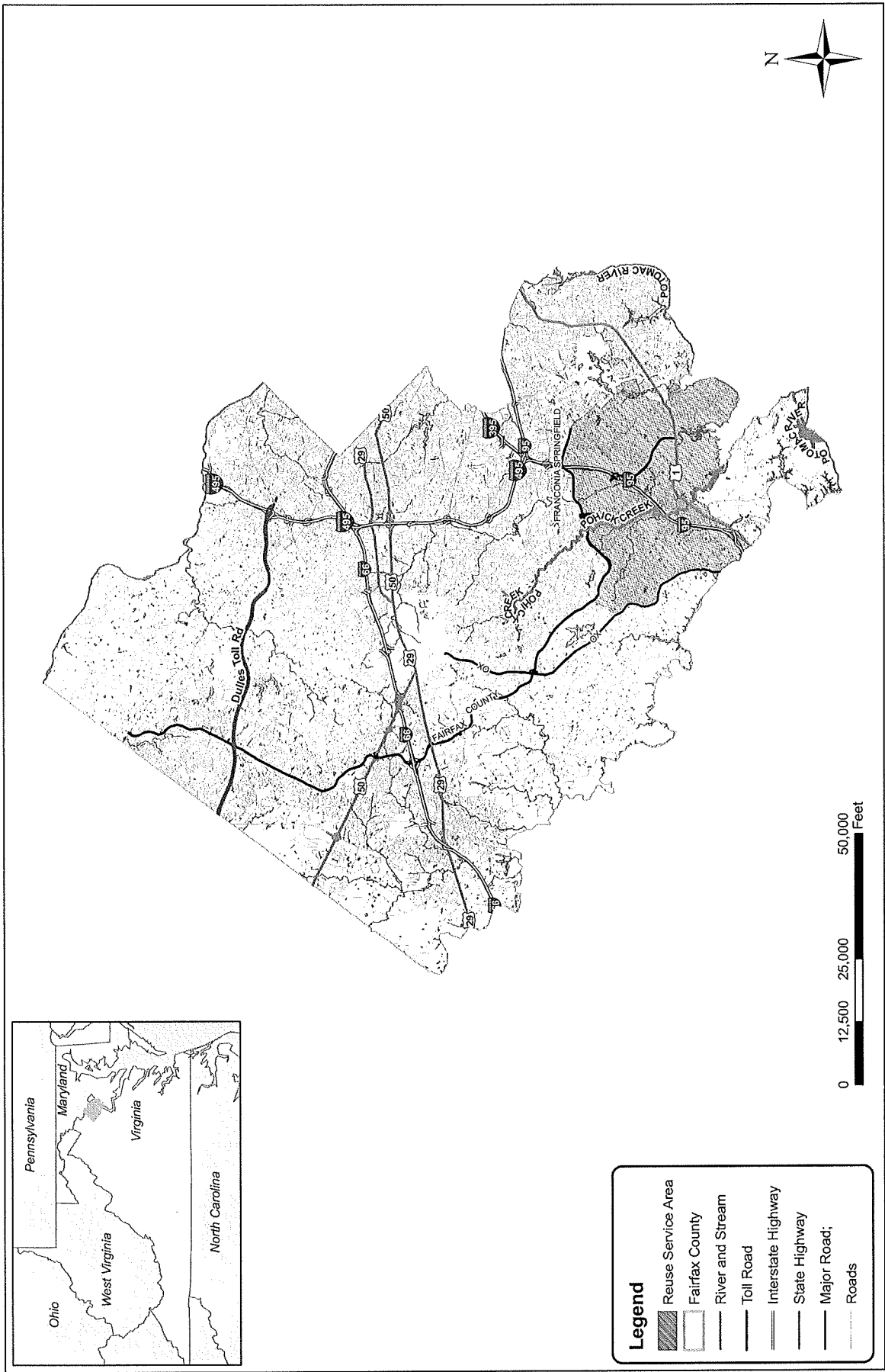
- Ir = irrigation requirement
- $ET_p$  = potential evapotranspiration for clipped grass in inches per day (in/d)
- Kc = crop coefficient for turf grass (typical value 0.6 to 0.8)
- $r_e$  = effective precipitation coefficient (typical value .15 to .51, use .5 for this area)

Using the above calculation the following Seasonal Reuse Water flows are taken from Table 2-4 at the end of this section.

LOCATION	SEASONAL REUSE WATER FLOW (GALLONS)
LAUREL HILL GOLF COURSE	25,575,000
LAUREL HILL RECREATION AREA	11,367,000
LOWER POTOMAC PARK	7,104,000

Irrigation rates are calculated for a particular time of year and location using regional average values for each of the parameters in the Penman method. The irrigation rate will then be electronically recorded to demonstrate that the rate remains supplemental for every day that irrigation occurs with reclaimed water. NMPCP staff will review the recorded irrigation flows to ensure that only supplemental irrigation is practiced.

The two Park locations, Laurel Hills Golf Course and Lower Potomac Park have similar parameters such as vegetation, annual daytime hours, and temperatures. Using factors obtained from the National Engineering Handbook, Part 623, the following tables were created to account for total usage. See attached Table 2-4.



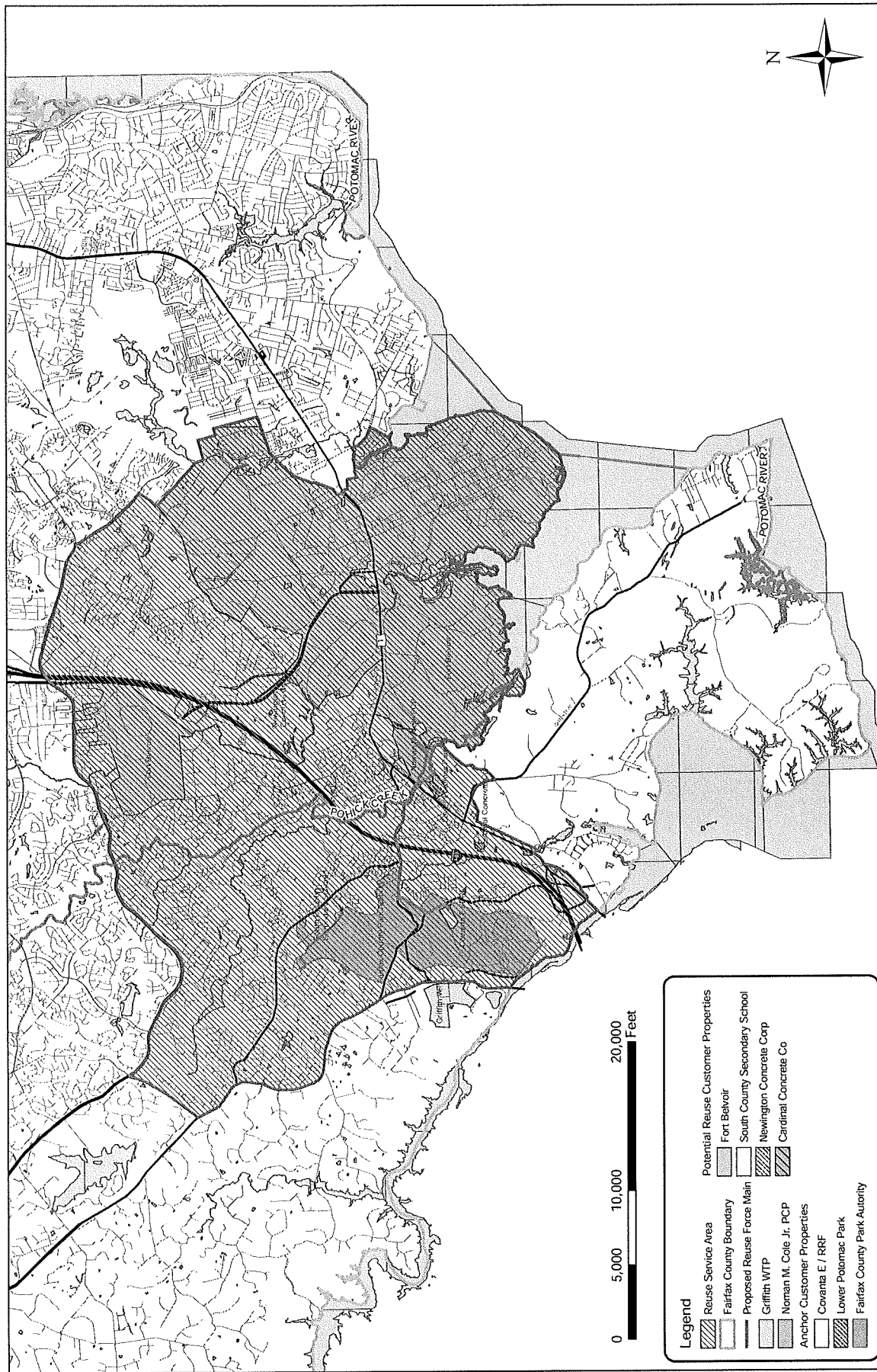


Figure 2-5  
Potential Reclaimed Water Customers In Fairfax County Reuse Service Area

**Table 2-3**  
**Potential Reuse Customer Information in Fairfax County Reuse Service Area**

	Reuse Category	Uses	Est. Annual Reuse Volume (MG)	Est. Instantaneous Peak Reuse (GPM)	Est. ADF During Low Demand Periods (MGD)
<b>Anchor Customer:</b>					
Covanta E/RRF 9898 Furnace Road Lorton, VA	6	Cooling Tower	766.5	2,085	1.68
FPCA Laurel Hill Golf Course	1	Recreation Fields / Golf Course	11.4 <sup>1</sup> / 25.6 <sup>1</sup>	800	0
FPCA Lower Potomac Park	1	Recreation Fields	7.1 <sup>1</sup>	231	0
<b>Potential Reuse:</b>					
Fort Belvoir	6	Cooling Tower	350 <sup>4</sup>	1,000	Unknown
South County Secondary School 8501 Silverbrook Road Lorton, VA 22079	1	Recreation Fields	5	Unknown	0
Cardinal Concrete Co 8115 Mims Street Springfield, VA 22150	5	Concrete Batch Plant	6.1 <sup>2</sup>	150 <sup>3</sup>	0
Newington Concrete Corp 8413 Terminal Road Newington, VA 22122	5	Concrete Batch Plant	6.3 <sup>2</sup>	150 <sup>3</sup>	0
<b>Total Reuse:</b>					
Reuse Category 1 – Urban – Unrestricted Access			49.1	1,040.5 <sup>5</sup>	0
Reuse Category 2 – Irrigation – Unrestricted Access			0	0	0
Reuse Category 3 – Irrigation – Restricted Access			0	0	0
Reuse Category 4 – Landscape Impoundments			0	0	0
Reuse Category 5 – Construction			12.4	300	0
Reuse Category 6 – Industrial			1,116.5	3,085	1.68
<b>Total</b>			<b>1,178.0</b>	<b>4,425.5<sup>5</sup></b>	<b>1.68</b>

Table 2-3 Notes:

<sup>1</sup>Flow based on Table 2-4.

<sup>2</sup>Flow based on average daily flow calculated from Fairfax Water 2005 meter data. 300 days per year operation assumed.

<sup>3</sup>Flow based on 8-hour shifts, daily maximum estimates and 1.5 peaking factor.

<sup>4</sup>Flow based on 6 million square feet of office space cooled using chillers and cooling towers.

<sup>5</sup>Includes average gpm from South County Secondary School (Based on Estimated Annual Volume)

Table 2-4  
Irrigation Rates Using Penman Formula

LAUREL HILL GOLF COURSE							
Month	Potential Evapo- transpiration (ET <sub>p</sub> ) <sup>1</sup>	Crop Coefficient (Kc) <sup>2</sup>	Average Precip (inches) <sup>3</sup>	Effective Precip (re) Coeff <sup>4</sup>	Ir (inches)	Acres	Acre- inches
April	2.13	0.75	2.93	0.5	0.13	90	12
May	3.87	0.75	3.48	0.5	1.16	90	105
June	5.5	0.75	3.35	0.5	2.45	90	221
July	6.51	0.75	3.88	0.5	2.94	90	265
August	5.84	0.75	4.4	0.5	2.18	90	196
September	4.06	0.75	3.22	0.5	1.44	90	129
October	2.15	0.75	2.9	0.5	0.16	90	15
Seasonal Flow (gallons)							25,574,995
LAUREL HILL RECREATION AREA							
					Ir = ((ET <sub>p</sub> * Kc) - r <sub>e</sub> )		
April	2.13	0.75	2.93	0.5	0.13	40	5
May	3.87	0.75	3.48	0.5	1.16	40	47
June	5.5	0.75	3.35	0.5	2.45	40	98
July	6.51	0.75	3.88	0.5	2.94	40	118
August	5.84	0.75	4.4	0.5	2.18	40	87
September	4.06	0.75	3.22	0.5	1.44	40	57
October	2.15	0.75	2.9	0.5	0.16	40	6
Seasonal Flow (gallons)							11,366,664



Table 2-4  
Continued

LOWER POTOMAC PARK									
Month	Potential Evapo- transpiration (ET <sub>p</sub> ) <sup>1</sup>	Crop Coefficient (Kc) <sup>2</sup>	Average Precip (inches) <sup>3</sup>	Effective Precip (re) Coeff <sup>4</sup>	Ir (inches)	Acres	Acre- inches	Acre Conv. <sup>5</sup>	Gallons
April	2.13	0.75	2.93	0.5	0.13	25	3	27,154	89,948
May	3.87	0.75	3.48	0.5	1.16	25	29	27,154	789,163
June	5.5	0.75	3.35	0.5	2.45	25	61	27,154	1,663,183
July	6.51	0.75	3.88	0.5	2.94	25	74	27,154	1,997,516
August	5.84	0.75	4.4	0.5	2.18	25	55	27,154	1,479,893
September	4.06	0.75	3.22	0.5	1.44	25	36	27,154	974,150
October	2.15	0.75	2.9	0.5	0.16	25	4	27,154	110,313
<b>Seasonal Flow (gallons)</b>									<b>7,104,165</b>

1 Provided locally from University of Virginia Meteorological Data

2 Crop coefficient from Penman formula

3 Reagan National Airport WSO data

4 Average precip coefficient - Connecticut DEP Best Management Practice for Golf Course Water, 2006.

5 Conversion from acre-inches to gallons

Pursuant to the *Water Guidance Memo No. 10-2001, Implementation Guidance for the Water Reclamation and Reuse Regulation, 9VAC25-740-10 et seq.*, supplemental irrigation allows the application of water in addition to that volume lost to evapotranspiration by the crop where the additional water will “maximize production or optimizes growth of the irrigated vegetation.” This allows the use of additional reclaimed water to prevent the accumulation of salt in the soil resulting from supplemental irrigation. In the event that it is demonstrated that salt has accumulated or will accumulate to undesirable levels in the soil of the irrigation reuse site, the irrigation rate will be temporarily increased by 10% of the water lost to evapotranspiration, provided that the addition of reclaimed water has not and will not contribute to the salt problem.

### **2.3.2 Proposed Pipe Routing**

Hydraulic modeling has been conducted by Fairfax County and a proposed pipe route has been determined based on the potential customers identified. The proposed route includes a new 15,000 feet 20-inch transmission main from NMCCP to the Covanta E/RRF Plant cooling towers with a new reuse pump station located at NMCCP. Future main extensions and service connections from the Fairfax County reuse pipeline to other reuse customers will be constructed in accordance with Fairfax County Reuse Standards and the Virginia Water Reclamation and Reuse Regulation (Code 9VAC25-740-120). A map showing the proposed pipe routing was presented on Figure 2-5.

### **2.3.3 Reclaimed Water Pump Station**

Two new reclaimed water pumps will be installed in the existing APW pump station. These pumps will provide reclaimed water to the reclaimed water distribution system at a flow rate of 4,600 gpm (6.6 mgd).

### **2.3.4 Reclaimed Water Filling Station**

A reclaimed water filling station hydrant will provide reclaimed water for a limited number of customers not directly connected to the reclaimed water distribution system. The location of the filling station is shown on Figure 2-6. Customers will be able to fill a tank truck with reclaimed water and transport it off site for an approved reuse. Reclaimed water filling station customers will be permitted under a standard agreement that is discussed further in Section 4, and will be required to record their discharge of reclaimed water in a manner similar to those using the septage receiving facility. Usage of the hydrant will be monitored by a flow meter.

### **2.3.5 Reclaimed Water Storage**

A proposed totally enclosed storage tank will store 500,000 gallons of reclaimed water located on the Covanta E/RRF site, as shown on Figure 2-7. A second totally enclosed reclaimed water storage tank may be added to the site in the future if demand increases.

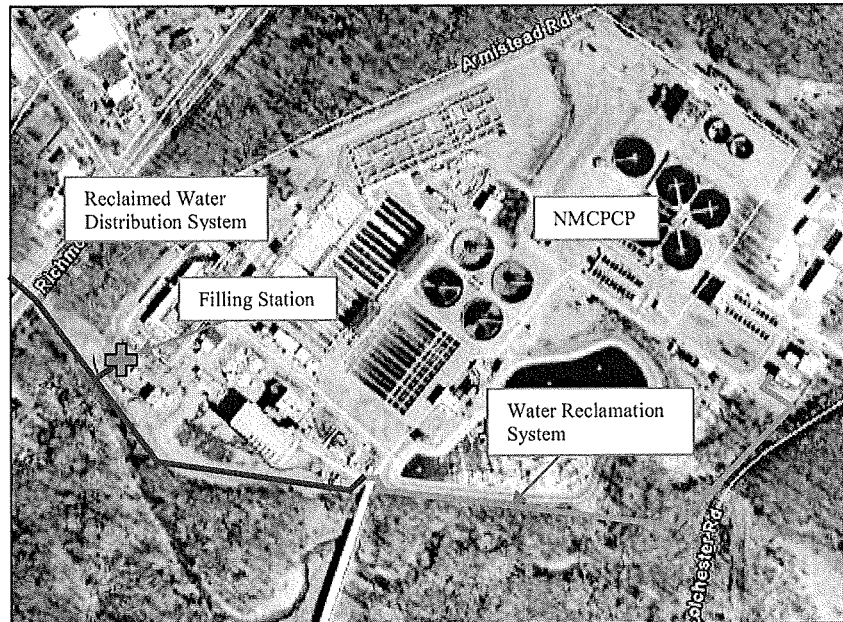


Figure 2-6  
Location of Filling Station (Source: Google™ Earth Pro)

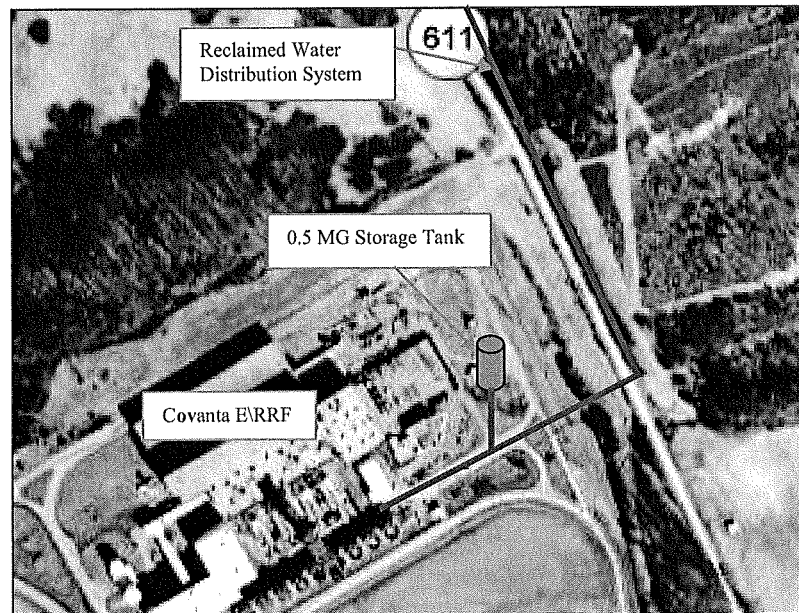


Figure 2-7  
Location of Reclaimed Water Storage Tank (Source: Google™ Earth Pro)

### 2.3.6 Public Water Supply Wells and Springs

No public water supply wells or springs are located within Fairfax County's Reclaimed Water Service Area.

### 2.3.7 Public Water Supply Intakes

There are no public water intakes within Fairfax County's Reclaimed Water Service Area.

## 2.4 Reclaimed Water Balance

Water balance modeling is an important planning tool when developing a water reuse system. Depending on the specific utility, water balance models can range from as simple as a balance between the supply and demand to as intricate as a model that takes into account soil infiltration characteristics, rainfall, peaking factors, and wet weather storage. A model should take into account the supplies to the system, which will include the effluent flow from the pollution control plant, as well as any supplemental water from an additional source or purchased from another utility. A comprehensive review of the system identifies the debits on the reclaimed water distribution system; including on-site plant water use, all residential/commercial users, municipal/institutional users, industrial users, and losses through the distribution system.

There are numerous equations to describe the water balance; however, it is most simply expressed as the balance of the inflows, outflows, and the change of storage over time as expressed below:

$$\sum \text{Inflows} = \sum \text{Outflows} + \sum \text{Storage/time} \quad (1)$$

$$\sum \text{Inflows} - \sum \text{Outflows} = \sum \text{Storage/time} \quad (2)$$

A water balance is required in support of the RWM plan that takes into account the following volumes of Reclaimed water:

- Water generated by the reclamation facility (NMCCPCP effluent) (designated design flow of the system);
- Water stored in the 0.5 mgd system storage tank;
- Water used by customers. The water balance must include seasonal and annual reclaimed water demand for each user based on projected volumes for new projects or actual volumes for existing projects; and
- Water discharged through a VPDES permitted outfall for reclamation systems.

Figure 2-8 quantifies the above requirements for the NMCCPCP reclaimed water balance. Seasonal variability is expected to be minimal for the Covanta E/RRF. The Covanta E/RRF experiences a higher demand in the summer when evaporation of the

cooling water is the highest, but will use significant quantities of reclaimed water year round. The demand from Fort Belvoir is also expected to be year round, but similar to the Covanta E/RRF, it is expected to drop during the winter months; however, the minimum flow is not known at this time. The remaining anchor and potential reuse customers are not expected to require year round reclaimed water. Irrigation is only required during the spring, summer, and fall months. Although the concrete batch plants will be in production most of the year, it is expected that reduce usage will occur at times in the winter months during cold weather. Periodic flushing of the reclaimed water mains during the low demand periods will assure that reclaimed water in the distribution system will continuously meet Level 1 standards. Table 2-3 includes the estimated average daily flow during low demand periods for the Covanta E/RRF.

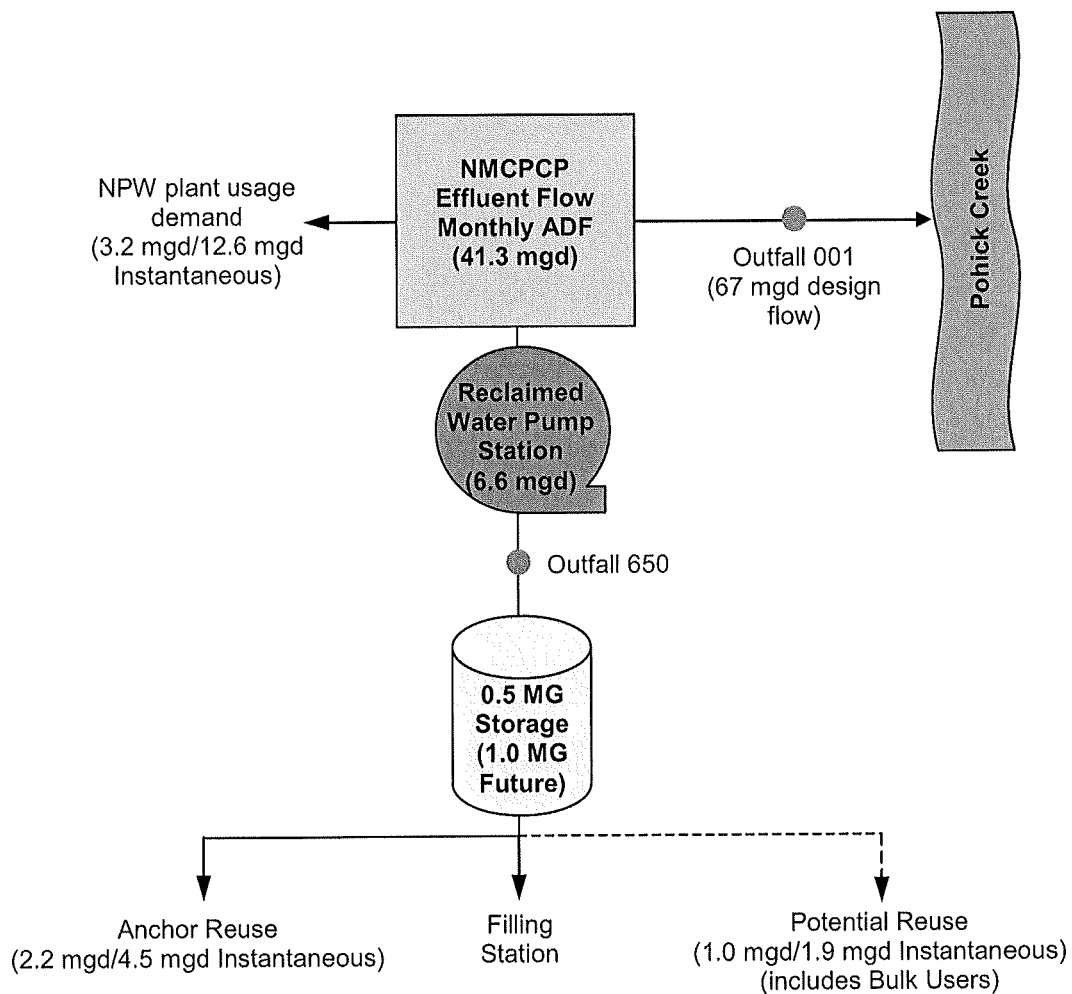


Figure 2-8  
NMCCP Reclaimed Water Balance (Annual Basis)

There is no current estimation reclaimed water demand from the filling station. Customers were not identified at the time of preparation of this RWM plan. Because

of the limited flows associated with the filling station, it is not anticipated to have a significant impact on the water balance.

The two outflows from the reclaimed water system are the Anchor Reuse and Potential Reuse. If the summation of these flows is greater than the inflow to the reclaimed water system from NMCCP, then storage is required.

The estimated average daily flows for the discharge from the reclaimed water system are documented in Table 2-5. The reclaimed water inflow is equivalent to the average daily flow at NMCCP (41.3 mgd from Jan 08-Jun 09, see Figure 2-6) minus the nonpotable water flow used at the Plant. The average inflow is greater than the reclaimed water outflows; therefore, no storage is necessary to meet average daily outflows from the reclaimed water system.

**Table 2-5**  
**Average Daily Reuse Balance**

<b>Demand</b>	<b>Estimated ADF (mgd)</b>
Anchor Customer	2.2
Potential Customer*	1.0
<b>Total Outflow</b>	<b>3.2</b>
ADF at NMCCP	41.3
NPW (Plant usage)	(3.2)
<b>Total Inflow</b>	<b>38.1</b>
<b>Balance</b>	<b>34.9</b>

\*Includes 10,000 gpd bulk users

The peak instantaneous demand of the reclaimed water system must also be less than the inflow to the reclaimed water system at the time of the peak demand or storage is needed to provide the additional volume of reclaimed water. The average flow through the Plant is not subject to diurnal variations due to the buffering of the EQ Ponds. It is safe to assume the average daily flow at the Plant is equal to the peak instantaneous flow. The total inflow to the reclaimed water system during peak demand is equal to the peak instantaneous flow at the Plant minus the capacity of the APW pump station after the planned addition of the Reclaimed water pump station. The peak demand is equal to the summation of the peak demand of Anchor Reuse and Potential Reuse flows. The peak demand is documented in Table 2-6. The total peak demand is equal to 6.4 mgd, which is less than the inflow (28.7 mgd); therefore, no storage is necessary to meet peak outflows from the reclaimed water system.

**Table 2-6**  
**Peak Instantaneous Reuse Balance**

<b>Demand</b>	<b>Estimated ADF (mgd)</b>
Anchor Customer	4.5
Potential Customer	1.9
<b>Total Outflow</b>	<b>6.4</b>
ADF at NMCPCP	41.3
NPW (Plant usage)	(12.6)
<b>Total Inflow</b>	<b>28.7</b>
<b>Balance</b>	<b>22.3</b>

The Reclaimed Water Pump Station has a capacity of 6.6 mgd with one pump in operation and one standby. The peak demand for the reclaimed water distribution system is equal to the peak demand of Anchor Reuse (4.5 mgd) and Potential Reuse (1.9 mgd) customers demand. The peak demand of the reclaimed water distribution system is 6.4 mgd which is less than the capacity of the Reclaimed Water Pump Station of 6.6 mgd; therefore, no storage is necessary to meet the reclaimed water distribution system peak demand.

There will be no discharge point from the reclaimed water system; the inflows to the system from the Plant will be controlled to equal the outflow demand. The remaining plant flow (anything in excess of the flow required from the reclaimed water system) will bypass the reclaimed water system and be discharged to Pohick Creek via NMCPCP's current VPDES permitted Outfall 001. If reclaimed water does not meet Level 1 standards, all flow from NMCPCP will bypass the reclaimed water system and be discharged to Pohick Creek via Outfall 001. Flow will not be accepted by the reclaimed water system until Level 1 standards are again achieved. Reclaimed water main flushing will be discharged into a Fairfax County Sanitary Sewer.

Although storage is not necessary to provide a water balance, as discussed above, storage is a necessary component of the reclaimed water distribution system. Without system storage, all pressure and flow in the distribution system would need to be provided by the reclaimed water pumps. System storage allows the pumps to shut down when the distribution system is fully pressurized, allowing for greater energy efficiency. In addition, should any repairs need to be made to the pump station, or should the pumps need to shut down due to a treatment issue, the reclaimed water users will continue to have a reliable source of reclaimed water.

## Section 3

# Regulatory Considerations

### 3.1 Reclaimed Water Treatment Levels

The new state regulation, effective October 1, 2008, defines two levels of treatment required for reclaimed water reuse. Level 1 for use on unrestricted access areas includes a minimum of secondary treatment and high level disinfection (consisting of filtration followed by disinfection) and Level 2, for more restricted areas requires a minimum of secondary treatment and standard disinfection. The regulation currently includes prohibitions against direct reuse, interior residential dual water systems, use of reclaimed water for swimming pools and hot tubs, and use of reclaimed water for food preparation.

Water reclamation and reuse from wastewater treatment plants in the Commonwealth of Virginia is regulated by the Virginia Administrative Code (VAC) under 9VAC25-740. Standards for reclaimed water are listed in 9VAC25-740-70. Table 3-1 summarizes reclaimed water standards in the Reuse Regulations.

Level 1 treatment applies to different types of urban unrestricted access uses including: landscape irrigation in public access areas, non-residential toilet flushing, fire fighting or protection and fire suppression in non-residential buildings, outdoor domestic or residential reuse, commercial car washes and air conditioning systems. In addition, irrigation of unrestricted access, specific industrial uses, and landscape impoundments with potential for public access must meet effluent requirements covered in Level 1 standards.

In addition to meeting effluent limits, the State of Virginia requires water reclamation facilities to obtain a Virginia Pollutant Discharge Elimination System (VPDES) permit or a Virginia Pollution Abatement (VPA) permit given the type of discharge. Fairfax County has an existing surface water discharge and the reclamation system will be covered under that VPDES permit.

The NMCPCP currently treats to Level 1 standards, which are summarized in Table 3-1. Fairfax County anticipates providing reuse water to large industrial and commercial users for irrigation, cooling water, and non-residential toilet flushing, as previously described in Section 2.3. In order to properly discharge to the reuse system, the Plant must comply with the standards listed in Table 3-1.



Table 3-1  
Standards for Reclaimed Water Effluent Limits (VAC)

Parameter	Level 1		Monitoring Point	Monitoring Frequency	Monitoring Requirements
	Standard	Corrective Action Threshold (CAT)			
Bacterial	Fecal coliform	≤14 colonies/100 mL <sup>1,6</sup>	Point of compliance <sup>4</sup>	Daily, ability to reduce to no less than 4 times a week <sup>5</sup>	Grab samples taken between 10:00 am and 4:00 pm
	E. coli	≤11 colonies/100 mL <sup>1,6</sup>	Point of compliance <sup>4</sup>		
	Enterococci	≤11 colonies/100 mL <sup>1,6</sup>	Point of compliance <sup>4</sup>		
TRC	-	<1.0 mg/L <sup>2,7</sup>	Point of compliance <sup>4</sup>	Continuous	On-line monitoring at end of contact tank or contact period
pH	6-9	-	Point of compliance <sup>4</sup>	Daily	Grab
BOD <sub>5</sub>	≤10 mg/L <sup>1</sup>	-	Point of compliance <sup>4</sup>	At least weekly	Same type and frequency as specified for sewage treatment works in the Sewage Collection and Treatment Regulations 9VAC25-790
CBOD <sub>5</sub>	≤8 mg/L <sup>1</sup>	-	Point of compliance <sup>4</sup>		
Turbidity	≤2 NTU <sup>3</sup>	>5 NTU <sup>3</sup>	Just upstream of disinfection	Continuous	On-line monitoring

<sup>1</sup>Monthly Geometric Mean

<sup>2</sup>Contact time of 30 minutes at average flow or 20 minutes at peak flow (Applies only if chlorine is used for disinfection)

<sup>3</sup>Daily average of discrete measurements recorded over a 24-hr period

<sup>4</sup>Point of Compliance for Level 1 Treatment shall be after all reclaimed water treatment and prior to discharge to a reclaimed water distribution system

<sup>5</sup>Flow greater than 0.5 mgd, for flows below 0.5 mgd refer to Virginia reuse regulations

<sup>6</sup>After disinfection

<sup>7</sup>A TRC less than 1.0 mg/L may be authorized by the board if demonstrated to provide comparable disinfection through a chlorine reduction program in accordance with the Sewage Collection and Treatment Regulations (9VAC25-790)

Operational data for the Plant is summarized in Table 3-2. This table outlines monthly averages for the regulated parameters. During this timeframe, all standards have been met while the treated effluent has been discharged into Pohick Creek. There were no effluent discharge violations during the 2008 calendar year. In 2008, the NMCPCP was recognized by the National Association of Clean Water Agencies (NACWA, formerly AMSA) with the Platinum Award for 100% compliance with its VPDES discharge permit limits on a Calendar Year Basis. The Plant has received this award for ten consecutive years. There are only 256 of the 16,000 wastewater treatment plants in the United States that have received this award. Fairfax County continues to be a leader in protecting the Chesapeake Bay and considers this as an initiative for FY 2009. Also, in FY 2007 and 2008, Fairfax County received a Business for the Bay Environmental Excellence Award for the nutrient removal program at the Plant.

**Table 3-2**  
**NMCPCP Operational Data Summary (Jan 08 – Jun 09)**

Effluent Characteristic	Discharge Limits (Monthly Average)	Monthly Average
<i>Escherichia Coli</i> (E. Coli)	126 CFU/100 mL	< 1.0 CFU/100 mL
pH	6.0 – 9.0 s.u.	6.8 s.u.
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	5 mg/L	Below quantification limit
Turbidity FF (Jan 08 – Jul 09, Daily Average)	2.0 NTU	0.65 NTU
Turbidity DD (Jan 08 – Jul 09, Daily Average)	2.0 NTU	0.48 NTU

## 3.2 Reclaimed Water Monitoring Requirements

### 3.2.1 Bacteria

At the Plant, grab samples for E. coli will be collected following chlorine disinfection at the new sample station (point of compliance). Samples are taken daily at least four days per week, to comply with the regulations. Bacterial sampling occurs between 10 a.m. and 4 p.m. to coincide with plant peak flows. Compliance with the geometric mean standards for E. coli is determined monthly, based on bacteriological monitoring results for that month. As summarized in Table 3-1, current effluent data from the Plant shows an average of <1.0 cfu/100 mL. The minimum value during the same time frame was <1 cfu/100 mL, while the maximum value resulted in 1.1 cfu/100 mL (January 2008 and March 2008).

If the Bacterial results come within 10% of the CAT limit, the operator will initiate a review of treatment operations and associated disinfection data to identify the cause of the increased Bacterial sampling results, with the intent to bring the system back into compliance. An elevated result approaching the Bacterial CAT will not initiate an

automatic diversion of flow away from the reclaimed water distribution system, but a diversion may be necessary if the reclaimed water does not remain in compliance.

Figure 3-1 is a graphical representation of the current *E. coli* sample results and the regulated maximum limits.

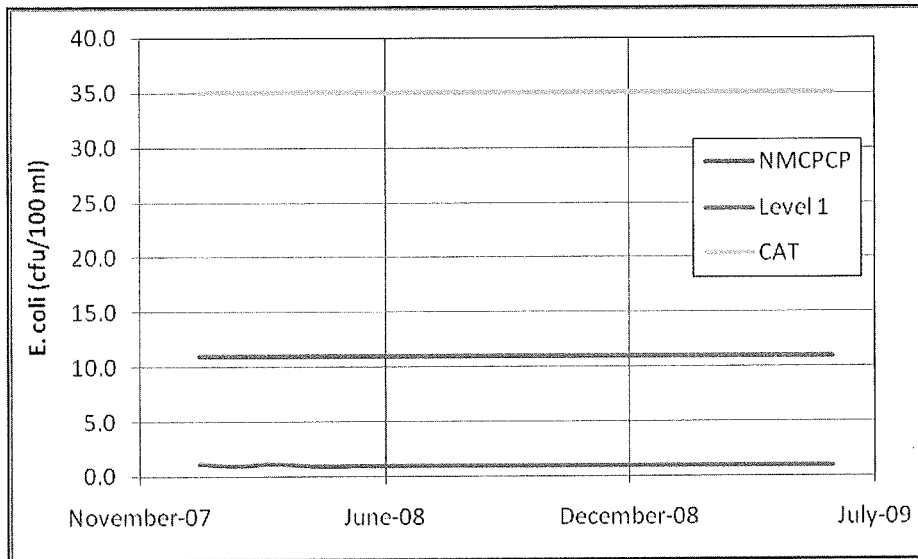


Figure 3-1  
NMCCP *E. coli* Summary

### 3.2.2 Total Residual Chlorine

Treated effluent at the NMCCP is chlorinated with sodium hypochlorite following filtration. The chlorinated effluent is then dechlorinated using sodium bisulfate prior to discharging into Pohick Creek. Reclaimed water will be diverted to the reclaimed water pump station from the chlorine contact tank prior to dechlorination. The existing Advanced Plant Water (APW) Pump Station will be modified with additional pumps to serve as the Reclaimed Water Pump Station.

Per the Reuse Regulation, NMCCP is required to monitor for TRC prior to discharging reclaimed water into the distribution system. The regulation for Level 1 treated water sets a CAT for TRC at 1.0 mg/L following a contact period of 30 minutes at average flow or 20 minutes at peak flow. A CAT for TRC below 1.0 mg/L may be authorized if the treatment plant is demonstrated to provide comparable disinfection through a chlorine reduction program. NMCCP has demonstrated to the State Water Control Board that it can provide comparable disinfection through a chlorine reduction program in accordance with the Sewage Collection and Treatment Regulations (9VAC25-790). As a result of the chlorine reduction program, NMCCP is permitted in their VPDES to reduce their final effluent TRC to 0.5 mg/L following the contact period and prior to dechlorination at the outlet of the chlorine contact tank, see Appendix A for page 11 from the VPDES Permit Program Fact Sheet. NMCCP requests that the CAT for TRC at the point of compliance be set at the same level as their VPDES permit (0.5 mg/L) for the reclaimed water system.

NMCCP's current VPDES permit allows no more than 36 samples per month to be below 0.5 mg/L for discharge to Pohick Creek. These allowances are not permitted for discharge to the reclaimed water distribution system. Therefore, a secondary chlorine injection point will be added downstream of the reclaimed water pump station to provide redundancy to the Plant's primary injection point. During normal operation, the primary chlorine injection point will provide the necessary chlorine dose to exceed the CAT for TRC at the new reclaimed water chlorine sampling point. A new online chlorine analyzer will measure the TRC upstream of the reclaimed water pump station. If the TRC nears the CAT upstream of the reclaimed water pump station, the secondary chlorine injection point will provide an additional chlorine dose to prevent the TRC from reaching the CAT at the point of compliance.

The secondary chlorine injection point can also be used to provide additional chlorine to the reclaimed water system during periods of low demand to inhibit biological growth within the system and insure a residual is kept throughout the system. This can be used in conjunction with hydrant flushing to assure that high quality water will be available to all customers throughout the reclaimed water distribution system. Operational procedures for increased chlorine doses and hydrant flushing during periods of low demand will be included in the systems Operation and Maintenance Manual.

Because of the physical constraints of the Plant, drawing the reclaimed water from the final pass of the existing chlorine contact tank would be difficult to construct, therefore; the required chlorine contact time for Level 1 treated water will not be achieved in the existing chlorine contact chamber. A new chlorine contact facility will be installed downstream of the reclaimed water pump station to provide the required chlorine contact time for Level 1 treatment. This new chlorine contact facility will consist of approximately 1,800 LF of 36-inch DIP which will provide 30 minutes of contact time at average daily flow and 20 minutes of contact time at 4,600 gpm (reclaimed water pump station peak flow).

Since the reclaimed water has a separate chlorine contact facility, a new TRC sampling point will be constructed to monitor TRC prior to entering the distribution system. The new chlorine sampling station will serve as the "point of compliance" for TRC. The reclaimed water distribution system will begin after this point in the system. The sampling facility will consist of a continuous on-line monitoring system with data recording and an automated alarm tied to the existing Plant SCADA system to assure that there is a minimum of 0.5 mg/L chlorine residual. If the Corrective Action Threshold (CAT) is reached for TRC, the Plant's PLC will turn off the pump at the reclaimed water pump station, thereby diverting all plant flow to Outfall 001. Additionally, should the pumps fail to shut down; the PLC will actuate a pair of valves to divert the water from the point of compliance to the head of the AWT process. Figure 3-2 shows the locations of the chlorine injection, sampling, and reject water diversion points, and Figure 3-3 shows a schematic of the NMCCP reclamation system.

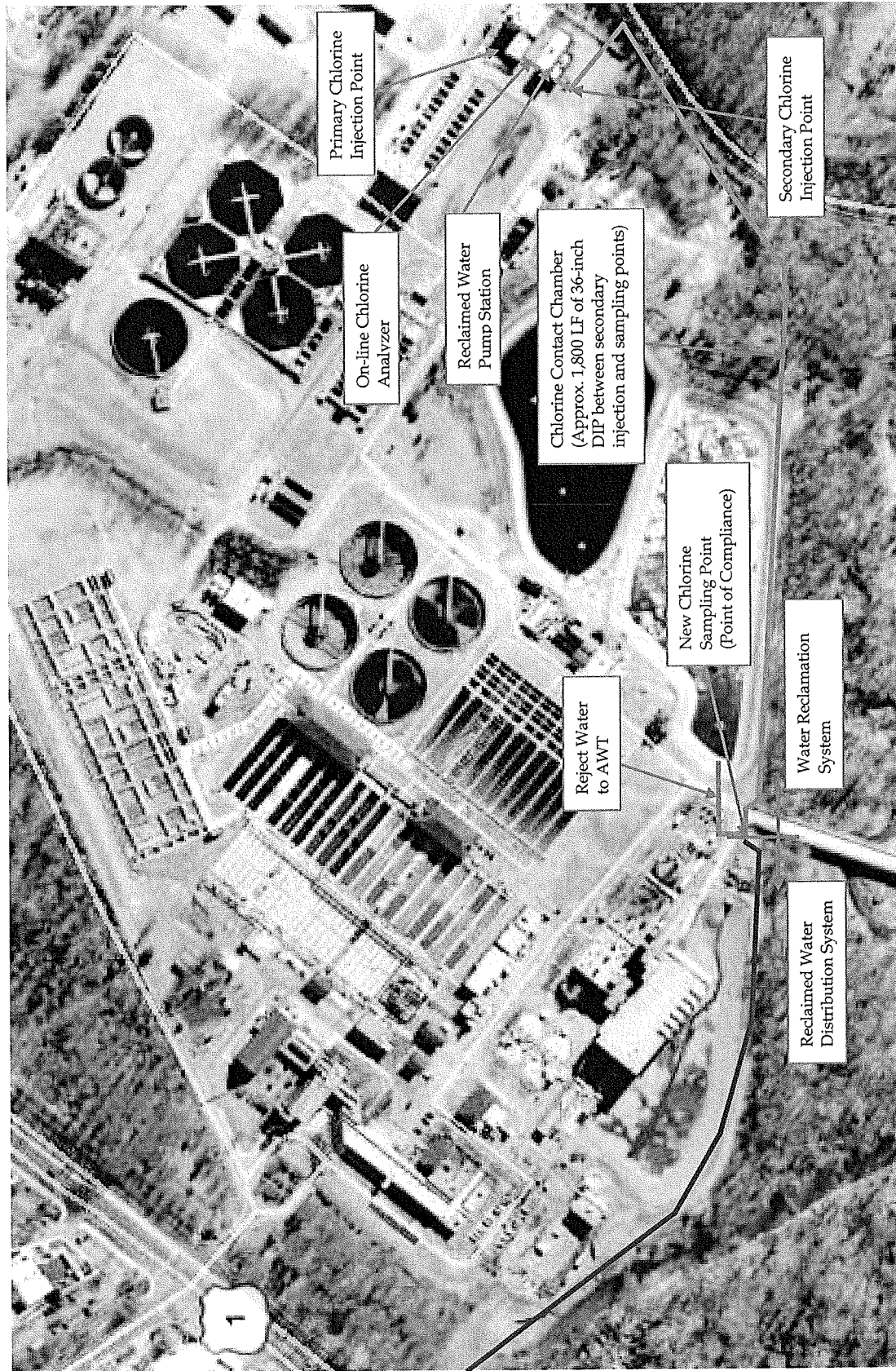


Figure 3-2  
NMCPCP Chlorine Injection and Sampling Points (Source: Google™ Earth Pro)

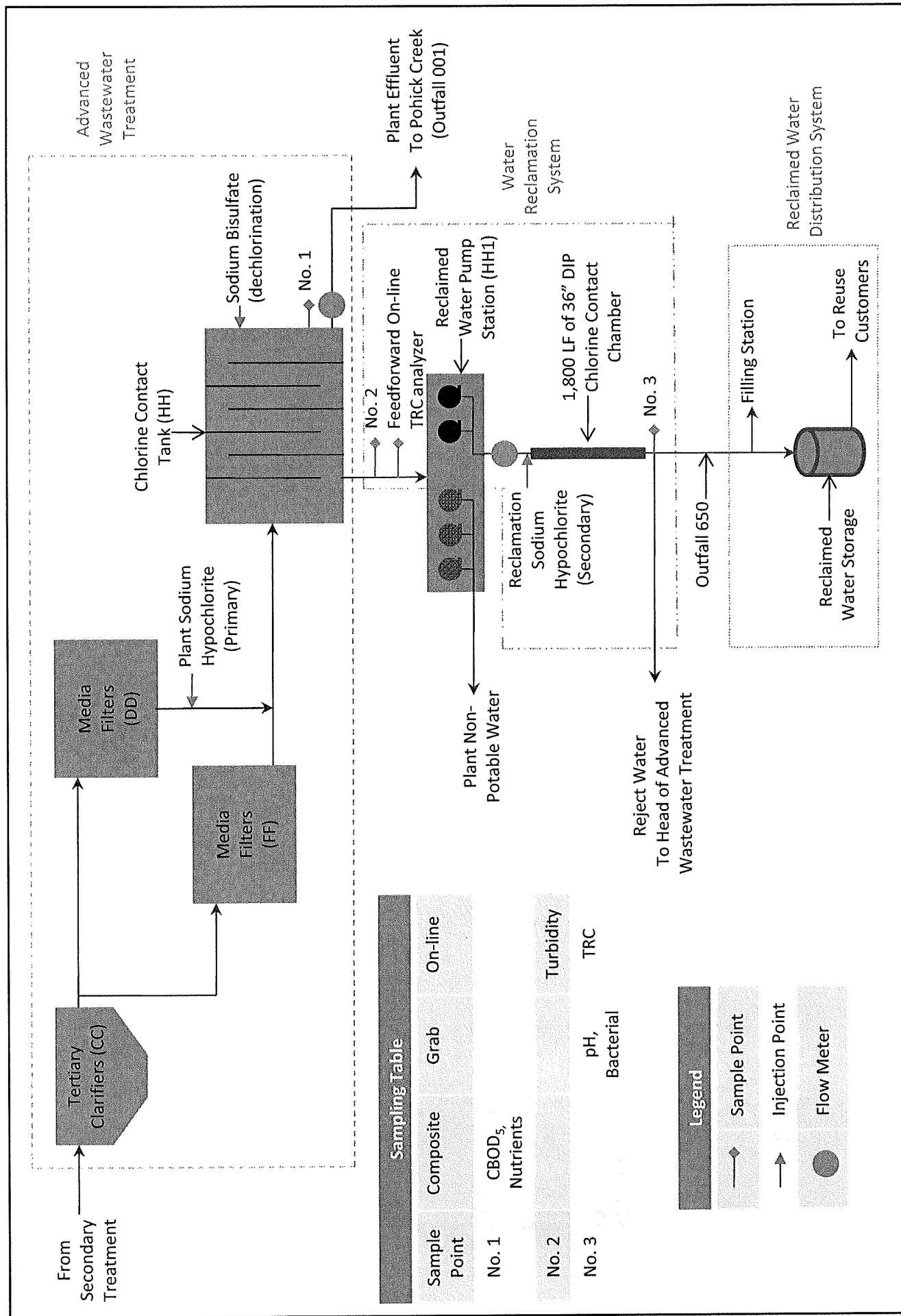
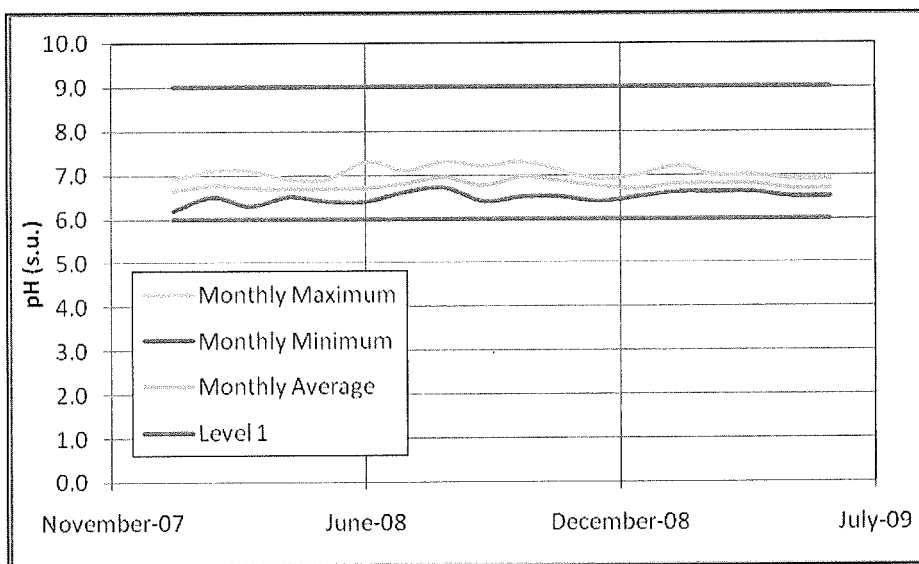


Figure 3-3  
Reclamation System Process Flow Diagram

### 3.2.3 pH

Reclaimed water treated at the NMCCPCP is within the required pH concentration requirements of between 6.0 and 9.0 standard units (s.u.). As summarized in Table 3-1, current effluent data from the NMCCPCP shows an average of 6.8 s.u. The minimum value during the same time frame was 6.2 s.u. (January 2008), while the maximum value resulted in 7.3 s.u. (June, August, and October 2008). **Figure 3-4** is a graphical representation of the current pH sample results and the regulated minimum and maximum limits. pH will be monitored at least once per day at the new sample station (point of compliance). Compliance with the range of the pH standard is determined daily based on the pH of the samples. This meets DEQ standards for water reuse.

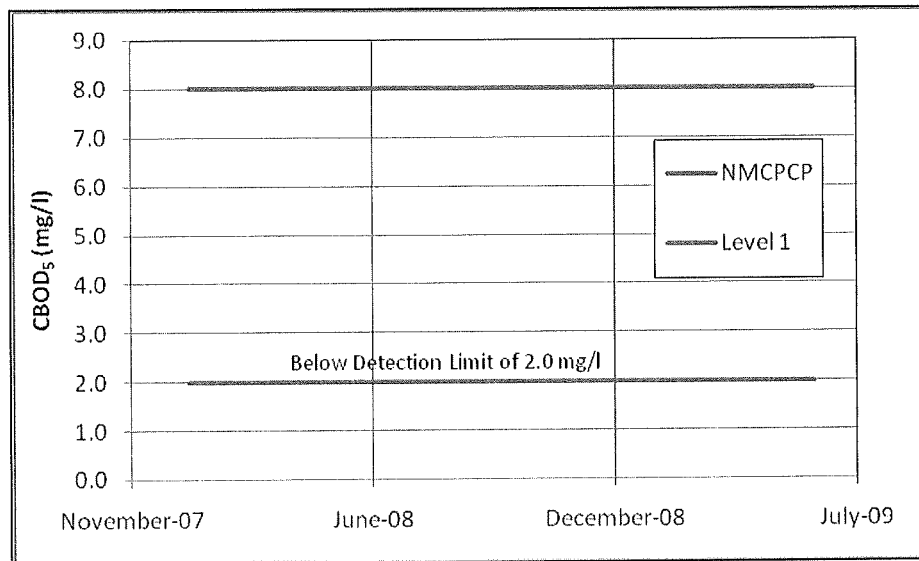


**Figure 3-4**  
**NMCCPCP pH Summary**

### 3.2.4 CBOD<sub>5</sub>

CBOD<sub>5</sub> levels are required to be less than or equal to 8 mg/L for Level 1 treatment for reclaimed water discharge. CBOD<sub>5</sub> currently is sampled at NMCCPCP per their current VPDES permit. The current measured CBOD<sub>5</sub> levels have been below the detection limit of 2.0 mg/L. Figure 3-5 summarizes the CBOD<sub>5</sub> data along with maximum limits.

The Reuse Regulation states that sampling must take place "at least weekly or more frequently based on the design flow of the reclamation system, and shall be the same sampling type and frequency as specified for sewage treatment works in the Sewage Collection and Treatment Regulations." In compliance with this regulation, CBOD<sub>5</sub> sampling occurs three days per week. Compliance with the monthly and maximum weekly average CBOD<sub>5</sub> standards are determined monthly, based on the arithmetic mean of all samples collected during the month. This meets DEQ standards for water reuse.



**Figure 3-5**  
**NMCCPCP CBOD<sub>5</sub> Summary**

### 3.2.5 Turbidity

Daily average of discrete measurements recorded over a 24-hour period for Turbidity are required to be below 2.0 nephelometric turbidity units (NTU) for Level 1 treatment for reclaimed water discharge. Turbidity is currently measured at the NMCCPCP at the effluent of each filter train (DD and FF). The average current turbidity level from Filter DD is 0.48 and the maximum and minimum values over that time period are 1.59 and 0.20 respectively. The average, maximum, and minimum values for Filter FF are 0.65, 2.30, and 0.07 respectively. Figure 3-6 is a graphical representation of the current Turbidity sample results and the regulated maximum limits.

Turbidity will be monitored continuously upstream of the reclaimed water pump station using a new in-line turbidity meter. The point of compliance for turbidity is the new on-line turbidity meter shown in Figure 3-3. The SCADA system will notify the operator when the CAT for Level 1 is in jeopardy of being exceeded. The operator will initiate a review to identify the cause of the CAT monitoring results. Corrective action is taken at this time potentially including adjusting filter backwash.



Resampling will occur within one hour, if the water remains out of compliance the water will be diverted away from the reclaimed water distribution system to Outfall 001 until the water can be brought back into compliance. Once the water is brought back into compliance, resampling will occur within the hour to verify that the water meets Level 1 requirements.

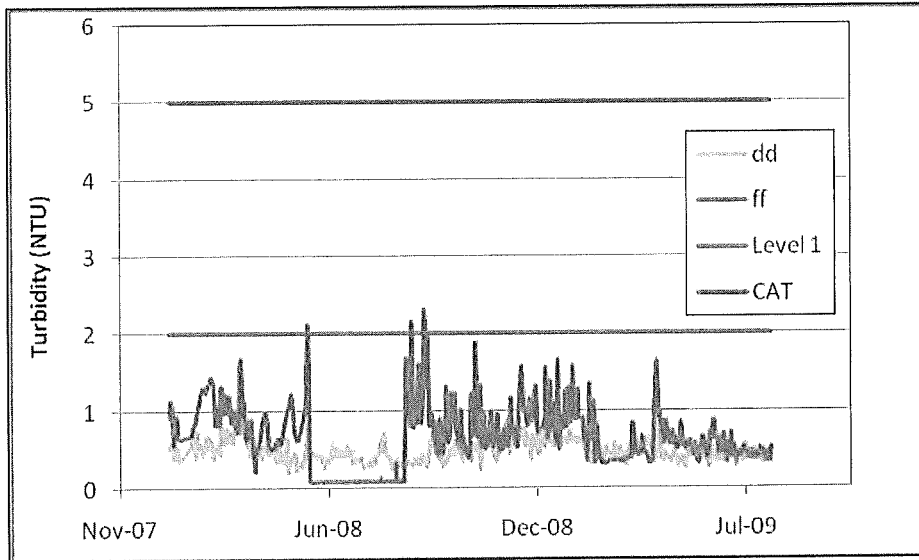


Figure 3-6  
NMCCP Turbidity Summary (Daily Average)

### 3.2.6 End User Notification

Fairfax County will notify end users and the affected public of any treatment failures at the reclamation system that can adversely impact human health, or result in loss of reclaimed water service, as follows:

- Where the CAT of the reclaimed water is reached, and the reclaimed water is not brought back into compliance with Level 1 treatment in accordance with 9VAC25-740-70 within the time frame set in 9VAC25-740-70 C more than once during a seven-day period, and the non-compliant reclaimed water has been discharged to the reclaimed water distribution system, Fairfax County will notify the end user of the treatment failures and advise the end user of precautions to be taken to protect public health when using the reclaimed water in areas accessible to the public or where human contact with the reclaimed water is likely. These precautions shall be implemented for a period of seven days or greater depending on the frequency and magnitude of the treatment failure.
- Should the CAT for turbidity or TRC be reached the operator of the reclamation system shall immediately initiate a review of treatment operations and data to identify the cause of the CAT monitoring results to bring the reclaimed water back into compliance with the standards. End users will be notified and reclaimed water will be diverted away from the reclamation system within one hour of first

reaching the CAT if subsequent resampling demonstrates that the reclaimed water remains out of compliance.

- Where reclaimed water service to end users will be interrupted due to planned causes, such as scheduled repairs, Fairfax County will provide advance notice to end users of the anticipated date and duration of the interrupted service.

Where reclaimed water service to end users is disrupted by unplanned causes, such as an upset at the reclamation system, Fairfax County will notify end users and the affected public of the disrupted service if it cannot or will not be restored within eight hours of discovery.

# Section 4

## Implementation Strategy

### 4.1 Implementation Plan

The following sections describe the implementation strategy undertaken by Fairfax County to develop a public education program focused benefits of reuse, a cross connection and backflow prevention program, standards and details, and service agreements and/or customer contracts with each potential reuse customer prior to coming on-line.

The County's short-term program involves restricting access to reclaimed water for reuse to large users and not to the general public at this time. As a result, their implementation strategy will be focused on educating the users on operations and maintenance of their reuse systems. Construction oversight of the reuse facilities will be performed by the County, which allows the County to educate their employees as to the appropriate construction, cross-connection, and backflow prevention methods using the standards and details developed for this program.

#### 4.1.1 Public Education Program

Fairfax County has begun a public education program to make the public aware of the use of reclaimed water and its benefits, precautionary handling of reclaimed water, and the need to alert and educate the public and users on those issues. Meetings and communications with stakeholders, decision makers (both internal and external to Fairfax County), potential users, and the public are necessary to ensure the success of the program. Not only is increasing public awareness of the safe handling of reuse water a goal, but gaining internal support from various branches of the County to implement the fail-safes required is important.

The County has performed presentations to members of the Board of Supervisors and their Environmental Committee, the South County Federation (a local public group), and the Fairfax County Park Authority and Health Department. Fairfax County is also answering this challenge by developing fact sheets for both internal and external use. Internal presentations will continue to be made by Fairfax County staff in support of the reuse program and its many benefits in helping to meet Fairfax County's anticipated effluent limits tightening. External fact sheets will be created for customers included pertinent facts about reuse water. Additionally, a water reuse brochure will be developed to increase the public's understanding of the quality and safety of reclaimed water, how it could be used, and the benefits of using reuse water while conserving potable water, particularly during droughts. These methods will help increase support for the Reuse Program.

The County has developed an extensive Reuse Outreach Program intended to educate both users and the general public. The following schedule will be used by the County to implement the current Reuse Program. Many of these action items are already underway.

Public Outreach Action	Proposed Date
Board of Supervisors presentation	Fall 2009
Meet with Park Authority and Health Dept	Fall 2009
Presentation to Little League	Fall 2009
Generic Tri-Fold created for general public	Fall/Winter 2009
Safety Tri-Fold	Spring 2010
Web site FAQ	Spring 2010
Posters/Signs for group presentations	Fall 2010

#### 4.1.2 Cross Connection/Backflow Prevention Control Program

As part of the implementation of a reuse program, Fairfax County is currently developing a Cross Connection/Backflow Prevention Program (CC/BFP) specifically for its reclaimed water system to ensure its proper usage. Fairfax County currently manages the potable water backflow prevention program for Fairfax Water. This is part of an agreement with Fairfax Water to administer the program as required under the Virginia Department of Health Waterworks Regulation. To implement a reuse cross connection program, minor modifications will be made to that program as described below.

A comprehensive CC/BFP for the reclaimed water system will include a Cross Connection/Backflow Prevention Program procedures manual, cross connection diagrams, and inspection forms. The program will include procedures and standards for both Fairfax County and its contractors to follow to ensure public health and safety through the appropriate installation and inspection of the reclaimed water system.

The CC/BFP program manual will require testing and inspections to be performed for every reclaimed water user to protect public health and end Users' facilities from cross contamination. They will include, at a minimum, backflow prevention testing, pressure testing, and annual site visits. A certified plumber will perform backflow prevention testing on an annual basis and provide testing results to Fairfax County. Pressure testing will be performed on a user's reclaimed water system prior to the initial connection to Fairfax County's reclaimed water distribution system, after any modification to a user's reclaimed water system, and on a periodic basis (not to exceed 4 years between pressure testings). The annual site visits will verify the user is operating their reclaimed water system in accordance with 9VAC25-740 and the User's Service Agreement.

A copy of the program is available as Appendix B.

#### 4.1.3 Standards and Details

Fairfax County developed Reuse Water Standards and Details to meet the equipment standards, assure quality workmanship, and meet the recently developed State requirements (spacing, signage, etc.). Based from Fairfax County's *Public Facilities*

*Manual*, these standards and details will ensure public health and safety through the proper installation of appropriate equipment for the reclaimed water system. These standards will be used by engineers and contractors in Fairfax County during design and construction of water reuse facilities and distribution systems within the Water Reuse Service Area. The constructed facilities will be owned and operated by Fairfax County up to the meter, and it is critical that the materials and quality of construction meet those defined Fairfax County standards prior to acquisition and use. Similar to water standards, these documents include minimum materials of construction, valves, pipes, testing requirements, and set the standards for construction that will sustain Fairfax County for years to come.

#### **4.1.4 Service Agreements**

Per 9VAC25-740-40 C, Fairfax County is responsible for the monitoring and management of individual end users with a service connection for reclaimed water and will have service agreements between Fairfax County and these individual end users.

Fairfax County has developed a Water Reuse Service Agreement Template to be used for all new customers. This agreement benefits Fairfax County by protecting their rights, promoting long-term use, and confirming the commitment from the user. It also protects the rights of the User since the use of this reclaimed water will become an integral part of business operations. Included as Appendix C, this template Agreement meets the needs of both Fairfax County and the users by being flexible enough to be used by various Users, yet includes all the requirements needed by Fairfax County to secure reuse well into the future. This template also includes additional requirements for irrigation water and process water in its appendix. These requirements are more site specific than the general requirements located in the Service Agreement and can be modified depending on the intended reuse activities.

In addition to a Water Reuse Service Agreement Template, Fairfax County has developed a Filling Station Service Agreement Template to use for customers to fill tank trucks with reclaimed water at a designated filling station. The Filling Station Agreement does not promote long-term use in the same manner the Reuse Agreement Template does, however, it does provide easy access for customers to come and pick up reclaimed water for approved reuse activities. The filling station will provide reclaimed water for construction and irrigation reuse while helping to promote Fairfax County's reuse system. The filling station will be an integral tool in selling the benefits of reclaimed water to potential new customers as the reuse system grows. The agreement is included in Appendix D.

#### **4.1.5 Bulk Irrigation Users**

The majority of anticipated users will be Bulk Irrigation Users (irrigation area greater than 5 acres). These users will comply with the requirements laid out in 9VAC25-740-170 and presented below:

1. For all irrigation reuses of reclaimed water, the following shall be required:
  - There shall be no application of reclaimed water to the ground when it is saturated, frozen, or covered with ice or snow, and during periods of rainfall.
  - The chosen method of irrigation shall minimize human contact with the reclaimed water.
  - Reclaimed water shall be prevented from coming into contact with drinking fountains, water coolers, or eating surfaces.
2. For bulk irrigation reuse of reclaimed water, the following shall be required:
  - Irrigation systems shall be designed, installed and adjusted to:
    - Provide uniform distribution of the reclaimed water of the irrigation site,
    - Prevent ponding or pooling of reclaimed water at the irrigation site,
    - Facilitate maintenance and harvesting of irrigated areas and precludes damage to the irrigation system from the use of maintenance or harvesting equipment,
    - Prevent aerosol carry-over from the irrigation site to areas beyond the setback distances and,
    - Prevent clogging from algae or suspended solids.
  - All pipes, pumps, valve boxes, and outlets of the irrigation system shall be designed, installed, and identified in accordance with 9VAC25-740-110 B.
  - Any reclaimed water runoff shall be confined to the irrigation reuse site unless authorized by the board.
3. Overspray of surface waters, including wetlands, from irrigation or other reuses of reclaimed water is prohibited.
4. Setback distances for irrigation reuses of reclaimed water.
  - For sites irrigated with reclaimed water treated to Level 1, the following setback distances are required:

• Potable water supply wells and springs, and public water supply intakes	100 ft
• Non-potable water supply wells	10 ft
• Limestone rock outcrops and sinkholes	50 ft

- For sites irrigated with reclaimed water treated to Level 1, no setback distances are required from occupied dwellings and outdoor eating, drinking and bathing facilities. However, aerosol formation shall be minimized within 100 feet of occupied dwellings and outdoor eating, drinking and bathing facilities through the use of low trajectory nozzles for spray irrigation, above-ground drip irrigation, or other means.
- For irrigation reuses where more than one setback distance may apply, the greater setback distance shall govern.
- Unless specifically stated otherwise, all setback distances shall be measured horizontally.

In addition to the irrigation requirements stated above Fairfax County will provide Best Management Practices for Irrigation with Reclaimed Water to all bulk irrigation users. This is provided in Appendix E.

Bulk Irrigation Users are required to provide a site plan per 9VAC25-740-100 C.6. The site plan shall include the following:

- The boundaries of the irrigation site;
- The location of all potable and non-potable water supply wells and springs, public water supply intakes, occupied dwellings, property lines, areas accessible to the public, outdoor eating, drinking and bathing facilities; surface waters, including wetlands; limestone rock outcrops and sinkholes within 250 feet of the irrigation sites; and
- Setbacks areas around the irrigation site.

Site plans for the two anchor customers (Fairfax County Park Authority and Lower Potomac Park) that plan on using reclaimed water for bulk irrigation are provided in Appendix F. Bulk irrigation users that apply for reclaimed water permits after this RWM plan will provide site plans in Exhibit A of the user agreement (Appendix C). These site plans will be provided to the State Water Control Board with the user agreement as an amendment to this RWM plan.

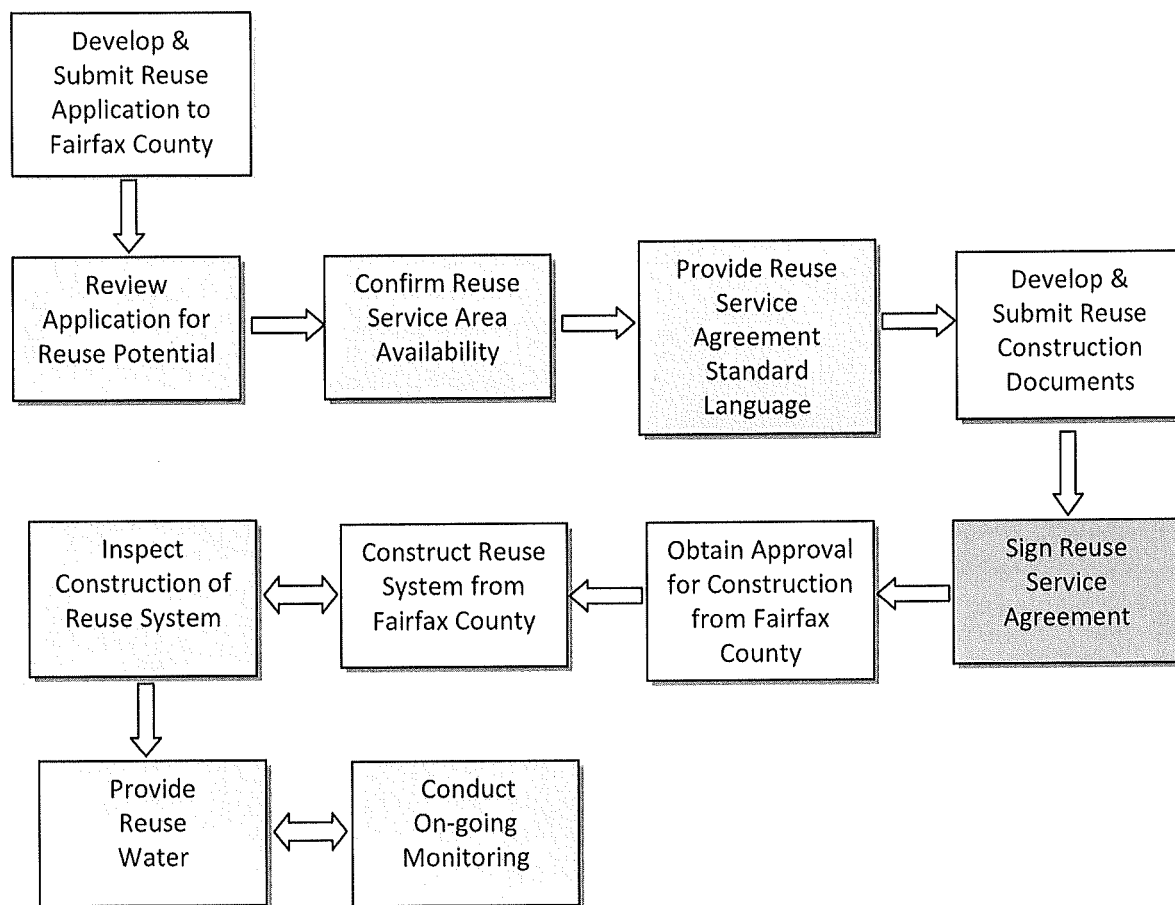
#### **4.1.6 Reuse Customer Implementation Schedule**

Implementing a reuse program within Fairfax County's service area, as summarized on Figure 4-1, begins with communication between Fairfax County and potential Users. Potential reuse customers will approach Fairfax County for a construction permit review. Once Fairfax County receives the construction permit documentation, they will review the potential for reuse at the particular site based on amount of reuse desired by the customer, location of the potential reuse site, and feasibility of transferring reuse to the site. If potential is identified, the reuse service area map will be checked for availability. Once it is determined that reuse is a viable option for the potential user, rate discussions will occur. Fairfax County will present the potential

User with typical reuse rates to determine a practical rate. Fairfax County will also provide the potential user with backflow prevention information, standards and details, and a typical service agreement. With this information, the potential User will develop and issue the reuse documents to Fairfax County for approval.

Following approval of the reuse customer, the reuse system is constructed in conjunction with inspection by Fairfax County. Fairfax County and the reuse User sign the service agreement, outlining all requirements. Per the Reuse regulations, once the system is constructed and reuse water is transferred to the reuse customer (the user), Fairfax County monitors the system, as described in Section 3 of this report.

**Figure 4-1**  
**Overview of Reuse Customer Implementation Process**



Notes:

- Activity performed by potential reuse User.
- Activity performed by Fairfax County.
- Activity performed by both potential reuse User and Fairfax County.